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been found on the summits of Mt. Marcy, Mt. Mansfield and on Mt. Washington, along the bridle-path, and on the timbers of the stable. There is one species only, which is found in the Southern States. In Europe they used to be common in Alpine pastures, but are growing rare, owing to the drying up and draining of the marshes. It is strange that they are able to maintain such a sporadic and scattered existence, when their food-supply is so uncertain and peculiar. New York Botanical Garden.

ON SOME FOSSIL MOSSES.

By John M. Holzinger.

Fossil mosses are rare. It is, therefore, with pleasure that I report on some from Iowa. In 1897 Prof. T. H. MacBride took from a railroad cut near Oelwein, Iowa, several wads of moss embedded in blue clay at a depth of 32 feet below the surface of the ground, beneath the Kansas Drift. This material was intrusted to Prof. P. C. Myers, at present science teacher in the Winona High School, for the purpose of ascertaining the presence of diatoms in the clay matrix, and it is from Mr. Myers that I have received this material for examination.

So far as I can ascertain, the age of the deposit under which this moss is found is estimated to be between 5,000 and 10,000 years. Small wonder, therefore, that the stems have become rather brittle. However, it is possible, as I have found by careful manipulation, to float out some stems which show the characteristic branching and leaf position of certain Harpidia, notably of *Hypnum fluitans*, and my conclusion after considerable work on this fragmentary moss, the leaf areolation of which is admirably preserved, is that it is certainly one of the Harpidia and comes nearest to *Hypnum fluitans brachydictyon* Ren. The preservation of this moss for so long a period is a matter of surprise. Two causes seemed to have conspired. First, it is a well known fact that peat bogs formed by the annual addition of vegetable matter furnished to the subaqueous stratum, have by this process antiseptic properties imparted to the water tending to preserve certain organic forms, and the aquatic habit of this Harpidium, together with the blue clay surrounding it (the color of blue clay being due to the presence of carbonaceous matter from bogs), point to this antiseptic bog water as a preservative. Secondly, the matrix, the blue clay, seems to have formed an effective mechanical protection, hermetically sealing it under tons of its substance against the access of air. This second element of protection alone could not have effected the preservation, and the first mentioned element, the antiseptic property of carbonaceous mud in bogs, has probably been the principal factor.

In this connection it is proper to call attention to an article in the Botanisches Centralblatt, 1901, Bd. X, Heft 3, on "A Fossil Moss from the Vicinity of Fulda," Germany. (Ueber ein Fossiles Laubmoos aus der Umgebung von Fulda,) by Mr. Adelbert Geheeb. The author, supported by Dr. K. Schliephacke, determined this moss as *Hypnum fluitans fossile. Amblystegium* *filicinum* had previously been found fossil by the author, also from near Fulda. Mr. Geheeb mentions still another fossil moss which was found in 1869, in the Schussenquelle, near Schussenried, Württenberg, by Apotheker Valet, and determined by Schimper as *Hypnum sarmentosum* Wahlenb., an arctic-alpine moss.

NOTE.—Since writing the above I have asked Dr. G. N. Best to examine the Oelwein moss. To my surprise he found the bulk of what I sent to be *Hypnum revolvens* Sw., coming in between var. *typicum* and *Cossoni*. He also found bits of a Calliergon which appears to be *H. Richardsoni*. This difference in conclusions led me to float out a larger quantity of the moss, submitting a second lot of twelve packets to Dr. Best, with the result that he agreed with my first determination of that material. I had doubtless overlooked the presençe of *Hypnum revolvens*, and the Calliergon, bits of both of which species are scattered through the mass of *H. fluitans*.

Prof. Myers also entrusted to me a very small bit fossil moss, taken eighteen feet under ground, also from under Kansas Drift, from the excavation under the Iowa City High School. This Dr. Best finds to be nearest to *Hypnum fluitans glaciale* Ren.

It thus appears that Iowa has furnished at least four fossil mosses. The material from Oeilwein is mostly *Hypnum fluitans brachydictyon* Ren., with a little *Hypnum revolvens* Sw., and *Hypnum Richardsoni*; the Iowa City moss is *Hypnum fluitans glaciale*, Winona, Minn.

SOME MOSS SOCIETIES.

By A. J. Grout.

By the above title I do not mean to designate any generalizations in the phytogeography of mosses, but merely to record a few observations on species associated together in different groupings under different conditions.

I was led to take up this topic by poor health, which prevented my walking more than two or three miles daily. To entertain myself I selected the various places mentioned in this account, and set myself to find all the mosses growing in each spot under conditions as nearly similar as possible. For instance, when collecting on the stone wall I carefully avoided plants growing on the soil at the base of the wall. I have been greatly surprised by the results, as I have collected several species for the first time, in localities that have been familiar to me for years, and I have discovered a great extension of range in at least one case (*Fabroleskea*).

I have also found several plants on unusual substrata, e. g., *Grimmia apocarpa* and *Hedwigia* on the old roof, and *Ulota crispa* on the stone wall. In this last case Dr. Best suggests that scraps of bark, etc., from the trees overhead furnished the material suitable for the first stages in the development of the plants.

Perhaps the most interesting collecting place was the cut in Brooklyn Heights, where the Wall St. Ferry cars pass up along Montague St., from the water level to the level of the Heights. The ground here is apparently springy, and in the chinks between the stones I found five or six species, the